

WAGE-PRICE RESTRAINT AND MACROECONOMIC DISEQUILIBRIUM

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During the past forty years the United States government has made numerous attempts to restrain wage and price increases. Initially these were associated with comprehensive wartime economic controls, as in World War II and, to a lesser extent, the Korean War. Several varieties of wage-price restraint were even attempted during the Viet Nam era. President Kennedy introduced "guideposts" in 1962 which were to "provide standards . . . not replace the normal processes of free private decisions." [3] Throughout President Johnson's tenure, wage-price restraint escalated as more detailed rules were established. Although the Nixon Administration first eschewed any type of wage-price restraint, it imposed a comprehensive wage-price freeze in August 1971. Controls of varying severity were maintained through April 1974.

Recently, even without the excuse of war, attempts to restrain individual wages and prices have remained remarkably durable. President Ford announced a "Whip Inflation Now" program in October 1974 which included a token mention of wage-price restraint. President Carter has announced several versions of wage-price restraint, the last of which was put forward in October 1978.¹ Other modern industrial nations with market economies have also made numerous attempts at wage-price restraint. And throughout history wage-price restraint has been repeatedly attempted in preindustrial societies.

Based on its frequency of use, one might conclude that wage-price restraint is a panacea. Yet on eco-

nomical and other grounds, such restraint has been charged with creating many severe difficulties while failing to curb inflation. This article delineates the persistent puzzle, continued advocacy of wage-price restraint by those who are well aware of its many drawbacks. Accordingly, some of the more obvious shortcomings of wage-price restraint are first reviewed. Second, a theoretical case for such restraint, shortcomings notwithstanding, is explained. In short, this article will present both the modern theory behind wage-price restraint as well as some severe, predictable pitfalls common to all control programs.

PRELIMINARY TOPICS

Effectiveness In subsequent parts of the article it will be assumed, for purposes of discussion, that wage-price restraint programs can be effective. However, this assumption may not be valid, since wage-price restraint conflicts with a basic human characteristic, the desire of individuals to improve their own welfare through trade. If each party involved in a transaction agrees to the price, or terms of trade, then clearly they believe the transaction to be mutually beneficial. Thus controllers seeking to prohibit such transactions, on the grounds that the terms of trade conflict with policy objectives, should not be surprised that the traders are willing to circumvent price regulations.

For example, although the sticker price of a new car might be frozen by law, a dealer can always vary the trade-in allowance, warranty terms, credit terms, predelivery preparation, etc. Similarly, automobile manufacturers can vary the options included or excluded on the same model, or introduce a new model that is only superficially different from the old. Since prices of new products, or new models of old products, are difficult to regulate, exchange may actually occur at the same quality adjusted price that would prevail in the absence of a price freeze.

Wage controls can also be circumvented. For one thing, employers may upgrade workers' jobs in name only, a difficult practice to detect. As an

¹ The latest program involves quasi-voluntary wage and price standards. Violators are explicitly threatened with bad publicity and loss of government contracts. Implicitly, possible violators must be aware of potential retaliation by regulatory agencies not formally incorporated in the wage-price control program. For example, the Carter Administration has recently hinted [11] that the amount of future trucking industry deregulation (by the Interstate Commerce Commission or by act of Congress) will depend on the outcome of Teamster wage negotiations. Due to the magnitude of discretionary authority possessed by the Internal Revenue Service, Environmental Protection Agency, Federal Trade Commission, Occupational Safety and Health Administration, etc., a large potential for retaliation confronts any business.

illustration, consider the opening of a new factory. While it would probably first attempt to hire skilled workers at prevailing wages, it might not receive a sufficient response, in which case it might choose to raise its wage offers. If confronted with wage controls, the newcomer might label its machinists "assistant mechanical engineers" and offer a higher wage. Price controllers may not realize that the jobs are the same, albeit with different titles. If not, existing firms, who continue to pay the controlled wage rate, must find some way of making their jobs more rewarding if they are to retain their employees.

In principle, given enough information, vigorous enforcement, and a legal staff large enough to either write clear regulations or litigate ambiguous ones, evasions could be controlled. In practice, however, the quantity of information required to evaluate product quality and to classify employee functions is enormous. Moreover, much of the data is rapidly changing. But if this information is not timely and acquired in useful form, evasion is both possible and profitable. At the very least, therefore, any discussion of wage-price restraint should consider the high cost of obtaining and evaluating information, as well as the cost of specifying clear regulations.

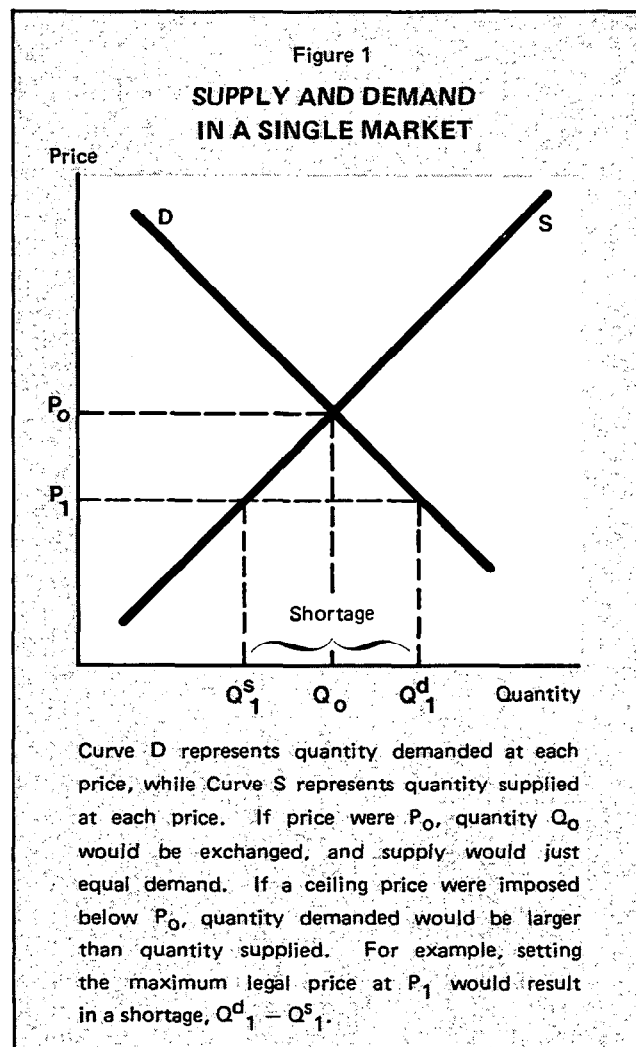
It should not be assumed that an ineffective attempt to control wages and prices indicates lack of will by controllers, since even the most draconian control measures have not always been successful. For example, the Roman emperor Diocletian initiated a program of wage-price restraint under which violators received the death penalty. One account reports that the law effected "much blood shed upon very slight and trifling accounts; and the people brought provisions no more to market." [6] The program "in shambles" was abandoned after thirteen years.

These difficulties notwithstanding, the remainder of this article will assume, for purposes of discussion, that wage-price restraint is able to hold wages, and prices received by sellers, below market levels. This assumption facilitates the discussion of some predictable consequences of effective wage and price restraint.

Single Market Effects A basic proposition of economics is that if a price is set below the market-clearing level, then actions by both buyers and sellers will be distorted. At an artificially low price, buyers wish to buy more than sellers wish to supply, and a shortage results in that market, as illustrated in Figure 1. Effective price control programs provide ample illustrations of such distorted behavior. A

particularly dramatic example was the televised drowning of baby chickens when the Nixon program of wage-price restraint froze the price of chickens while simultaneously exempting the price of grain included in chicken feed. Consequently it became less costly to kill a baby chicken than to pay high feed prices and sell the grown animal at the low controlled price.

Distortions created by price controls are exacerbated in an open economy. When a commodity is freely traded on the world market, the domestic price can diverge from the world price only by the cost of transportation. If the domestic price is kept artificially below the world price, there is no incentive for foreign producers to sell in the country with the controlled price. Moreover, it is more profitable for domestic producers to export rather than sell at the controlled price. However, if prices of traded goods are not controlled, a price control program would be limited to non-traded commodities such as haircuts and local telephone calls.



Another perverse effect is that even if the price a seller receives is below the market-clearing level, it does not follow that the buyer pays a below market price. If shortages occur and buyers as a whole cannot obtain all they wish at the controlled price, individual buyers may well spend valuable time and money attempting to buy the scarce good. The expense of waiting in lengthened queues, as well as additional search for a scarce item, are both included in the total cost of an item to a buyer.

A recent example occurred in early 1974, when the ceiling price of gasoline was set at an artificially low level. When predictable shortages occurred in several metropolitan areas, long lines appeared at open gas stations. Waits of well over an hour were common. Some dealers made it possible for buyers to avoid the lines by selling gasoline only to buyers of overpriced repair services.

Additionally, middlemen may be able to buy at the low, controlled price and sell at the higher price buyers are willing to pay. "FEA millionaires" were recently enriched by such reselling of domestic crude oil.

In short, when a price is restrained below the market-clearing level, the low price received by producers discourages production. And final buyers confront reduced supply, even though the item's total cost to an individual buyer may well be no lower than in an uncontrolled market.

GENERAL EFFECTS OF WAGE-PRICE RESTRAINT

Wage-Price Restraint as a Substitute for Monetary and Fiscal Restraint While economists generally agree that monetary and fiscal restraint will eventually lower inflation, such restraint will also temporarily lower real economic growth, possibly causing a severe recession. As the director of the Council on Wage and Price Stability, Barry Bosworth, put it, "In the last three recessions, on average you had to throw 1 million people out of work in order to get 1 percentage point off the rate of inflation. You have to do it for at least 2 years and each year you lose about \$75 billion worth of GNP." [12]

In light of this high cost, policymakers often refuse to lower inflation by lowering aggregate demand through monetary or fiscal restraint. Rather, wage-price restraint is advocated in place of lowered aggregate demand. The view that wage-price restraint and monetary-fiscal restraint are substitutes is exemplified by Sherman J. Maisel, a former governor

of the Federal Reserve Board, "Stable prices result primarily from either severe depressions or price-wage controls."

Moreover, the record of American policymakers also indicates that wage-price restraint is used as a substitute for monetary and fiscal restraint. During Phases I and II of the Nixon wage and price controls, the money supply (M_1) grew at an annual rate of 7.5 percent and the high employment deficit averaged 1.2 percent of GNP; during the tenure of the Nixon administration before Phase I, the money supply grew at an annual rate of 5.2 percent and the high employment surplus averaged 0.2 percent of GNP. Thus, both monetary and fiscal policies were less restrictive after controls were imposed.² Other American experiences with wage-price restraint were generally accompanied by expansionary monetary and fiscal policies.

When wage-price restraint is imposed as a substitute for monetary and fiscal restraint, it unfortunately shifts attention from monetary and fiscal policy to individual prices or wages. For example, shortly after President Carter announced the October 1978 wage-price restraint program, the mass media directed considerable attention to a relatively trivial matter, the rising price of Hershey chocolate bars. The monthly report on policy action released by the Federal Open Market Committee received almost no coverage. However, had the President, in his televised address, substituted a discussion of monetary policy for his lengthy discussion of single prices and wages, reporters might have paid more attention to the FOMC. At worst, this distracted attention can degenerate into a search for scapegoats while monetary and fiscal expansion remain unchecked.

A General Output Effect There is another, often overlooked effect of wage-price restraint when used as a substitute for monetary and fiscal restraint. Whenever a price level which cannot freely adjust is inconsistent with the existing level of aggregate demand and high output, the economy can encounter macroeconomic disequilibrium.

Robert Barro and Herschel Grossman have provided an incisive analysis of such disequilibrium. Both the informal discussion of this section and an

² A myopic measure of monetary policy, looking no earlier than May 1971, nor later than June 1972, would show the opposite. However, most economists believe that a few months is too short to establish a policy, since unrelated influences can cause abnormal figures in short period data. Thus, May-August 1971 would not be taken as indicative of precontrol policy.

Appendix giving a more elaborate disequilibrium analysis rely heavily on the Barro-Grossman presentation.³ While this method of analysis generally confirms conclusions of orthodox macroeconomics, its use helps divert attention from minor issues which have often obscured more important topics. One very important topic highlighted by Barro-Grossman is the macroeconomic importance of wage and price levels. A conclusion of this analysis is that when inflexible price and wage levels are too low (as would happen when wage-price restraint is effective) the result is macroeconomic disequilibrium, in this case labeled general excess demand. Consequences of general excess demand include involuntary unemployment and reduced production, *exactly as would be expected from a recession*. When general excess demand exists, economic recovery can occur only if (1) prices and wages rise, or (2) aggregate demand is lowered by monetary-fiscal restraint.

To understand these results, consider the essentials of a very simple disequilibrium model, containing (1) a household sector, whose members supply labor and purchase commodities, (2) firms which purchase labor and supply commodities, (3) a government which can create or destroy money, levy taxes, and buy commodities, and (4) price and wage levels which are realized as the outcome of all private and governmental decisions. When the economy functions normally, price and wage levels adjust so that output and employment are at high levels. For example, if the money supply⁴ were to rise in an economy with full employment, thereby raising aggregate demand, prices and wages normally would increase. However, if aggregate demand is greater than the economy can supply at current price and wage levels, but prices and wages are legally frozen, then something else has to give. And an output-employment fall is the only "give" left in the system.

Moreover, the fall is more severe than might be expected from looking only at single markets. Dislocations in one market can aggravate problems in another market and vice versa. If prices are too low

to equilibrate demand with available supply, households will not be able to buy all the commodities they wish, and they will thus tend to substitute current leisure for unavailable current consumption. Since more current leisure means less current work, firms will be unable to obtain the amount of labor they seek. However, a reduced amount of labor employed limits the amount of commodities firms can produce. In this manner an initial disturbance can cause self-reinforcing output-employment declines throughout the economy.

In short, output and employment fall when there is inconsistency among (1) high output and employment levels, (2) fixed price and wage levels, and (3) the prevailing level of aggregate demand. If either of the latter two elements were able to change, then output and employment could rise. Starting from an economy experiencing general excess demand, recovery could thus involve allowing prices and wages to rise. Alternatively, lowering aggregate demand, possibly by cutting the money supply, could also initiate recovery.

Fortunately, general excess demand has not been a problem in industrialized, market economies. Especially in the U. S. experience with wage-price restraint, it is hard to see any sign of general excess demand, which suggests that controls may have been more symbolic than real. An alternative explanation might be that single market distortions were promptly ameliorated by relaxing controls at the first sign of trouble. Consequently, the price level could rise and there would not be enough time for spillovers among markets to generate disequilibrium and a general output effect.⁵

Additionally, a real economy has, for a short time, more flexibility than the simple economy described above. Lower inventories, higher unfilled orders, and more employee overtime could be immediate responses to an aggregate demand increase. But there is a limit to the flexibility such measures can provide. Inventories cannot fall lower than zero, and employees will not accept whatever amount of overtime firms propose. Therefore, while an economy has many responses which can delay the onset of general excess demand, the delay is only temporary.

Events in post-World War II Germany can be interpreted as indicating general excess demand, al-

³ But any shortcomings in this article naturally are the responsibility of the author.

⁴ An increase in the money supply is used as an example of a change which affects aggregate demand. This category also includes changes in government spending, taxes, household preferences for current relative to future consumption, and in more complex models, changes in investment decisions of firms and net exports. Since the origin of an aggregate demand change is of secondary importance in discussing its qualitative effects, for ease of exposition the example of a money supply change will continue to be used as an example of a change affecting aggregate demand.

⁵ Eastern European economies might be studied for general excess demand effects, due to their rigid prices and expansive aggregate demand policies. However, necessary data on output, prices, and government policies are difficult to obtain in a form suitable for analysis. However, see Howard.

though there are other plausible explanations.⁶ In 1936 the Nazi government imposed a comprehensive price freeze, which combined with wages frozen at 1932 levels to yield a wage-price restraint policy which outlasted the Nazi government. In 1945 the Allied Control Authority maintained German price laws as well as local price control agencies. While it may not be surprising that a totalitarian police state was able to implement effective restraint, even under the Allies "price control during the first three years of occupation was surprisingly effective . . . the bulk of the goods changed hand at legal or nearly legal prices . . . legal wages prevailed throughout the economy." [9] On June 20, 1948, actions were taken which ultimately cut the money supply by 93 percent. Simultaneously much wage-price restraint was abandoned. As the economy recovered industrial production rose at an annual rate of 97 percent between June and November 1948. The German recovery is thus similar to recovery from general excess demand as modeled in this article. In both, cutting the money supply and relaxing wage-price restraint result in higher output and employment.

To summarize, users of the disequilibrium model are in the position of predicting the danger of general excess demand on the basis of theory unconfirmed by strong empirical evidence.⁷ If the analysis presented above is relevant, then to ignore the possibility of general excess demand would seem to imply that necessary conditions to create it are not met. That is, either wage-price restraint is believed to be ineffective or, as discussed below, it is expected to be used

⁶ Any discussion of the postwar German experience should mention what many economists would refer to as a severe identification problem. The identification problem arises because any economic result at the time can be plausibly attributed at first glance to numerous exceptional causes. One explanation of low output might note Allied bombing lowering the stock of business fixed capital. High output growth rates could be a catch-up to more normal levels or a result of Allied aid, notably the Marshall Plan. Surprisingly, Germany had substantial industrial capacity at the end of the war. Wallich noted that after allowing for in-plant repairs, more capacity was added during the war than was destroyed. He also noted that while Germany received \$4.5 billion in Allied aid, the Allies simultaneously imposed burdens on Germany including reparations, occupation costs, etc. that could offset some, or all, of the stimulating effects of aid payments.

Also, the data available are distorted by the pervasive black markets, hoarding, and bilateral barter of the period. For example, it is hard to interpret early industrial production figures due to hoarding by manufacturers (anticipating the relaxation of price controls) and sales in the black markets.

⁷ But the same approach applied to another problem, the business cycle characterized by periods of general excess supply, has better empirical support.

as a complement to, rather than a substitute for, monetary and fiscal restraint.

Wage-Price Restraint as a Complement to Monetary-Fiscal Restraint As discussed above, general excess demand can develop if prices are too low. But general excess demand is not the only possible form of disequilibrium. If rigid prices and wages are too high, then general excess supply is possible. For example, suppose that the economy is initially producing high levels of output and employment. Then suppose that the money supply is suddenly reduced, with prices and wages not immediately changing.⁸ The fall in real money holdings would result in a fall in the household sector's desired level of consumption, and an increase in their desired amount of employment (to restore some of their lost money holdings). Firms, however, would offer less employment, since their sales are down. But if firms cut the amount of employment, households would buy even less, leading to further drops in sales, jobs, income, and consumption.

The final outcome of the resulting general excess supply is lower output and employment. The reasoning behind this conclusion is analogous to the reasoning that general excess demand causes lower output and employment. Both general excess supply and general excess demand occur when inflexible wages and prices are inconsistent with government's monetary and fiscal policies, households' consumption and labor supply choices, firms' production and employment choices, and high output and employment levels. To restore equilibrium, one of two things must happen: either prices and wages must adjust to appropriate levels, or the government's monetary and fiscal policies must adjust aggregate demand appropriately.

The contention that monetary-fiscal restraint is a costly way to lower inflation has a firm foundation, namely the premise that such restraint would entail a period of general excess supply. That is, for some time after restraint is imposed on an inflationary economy, prices and wages would be too high and disequilibrium would develop. Were the government able to establish equilibrium levels of prices and wages at the initiation of monetary and fiscal restraint, disequilibrium could be avoided. This is a major reason why some economists continue to advo-

⁸ The Achilles Heel of this section is the failure to show why prices and wages would not adjust immediately and completely. An earlier discussion relied on the assumption of effective wage-price restraint. One approach, taken by Okun, notes that in an uncertain world buyers and sellers can benefit from formal and informal long term contracts which limit price and wage flexibility.

cate wage-price restraint despite its past performance.⁹

An observant reader might question the implicit contention that the government will have better information on appropriate price and wage levels than do households and firms. After all, the only information possessed exclusively by the government is the course of monetary and fiscal policy. Thus, it would appear that simply announcing policy changes before they went into effect would allow the private sector to adjust smoothly to the policy change. Unfortunately, this simple solution is probably too good to be true. Government policy has historically been so erratic that current announcements have little credibility. Moreover, formal and informal contracts would limit immediate price or wage adjustment in response to even a credible announcement.

Consequently, if one believes the government to possess better knowledge than the private sector on appropriate levels of wages and prices, and if one believes the government to be capable of promptly employing this knowledge in wage-price control, then one could logically support temporary wage-price restraint, concurrent with monetary-fiscal restraint.

⁹ Another economic argument for wage-price restraint rests on the concept of administered prices. While often stated as a simplistic conspiracy theory with little economic content, it can also be given a more sophisticated form. Imagine an economy with most prices determined by firms that can arbitrarily move price within a zone of control, and most wages set by unions with similar economic power. Now imagine one or both of these groups attempting to grab a larger portion of national income by using its economic power to push up prices or wages. That group could be successful, at least temporarily, if the government concurrently expanded aggregate demand enough so that sales and employment were not reduced. The result of this expanded aggregate demand, however, is inflation. Wage-price restraint, it is argued, is the best way to curb this "administrative inflation." Means has given a classic statement of this doctrine.

Even in its most sophisticated form, however, many economists do not find the argument persuasive. First, there may be better ways to limit price increases in concentrated industries. For example, proponents of the administrative inflation doctrine often point to the steel industry. But the steel industry has been able to raise prices only because the government has limited imports of low cost foreign steel. Thus, removal of import tariffs and quotas would allow American manufacturers to purchase low cost steel without wage-price restraint.

Also, if big business and big labor have enough political clout to induce the government to expand aggregate demand in the first place, they probably have enough clout to influence a wage-price restraint program in their favor. Moreover, it is not clear what fraction of prices and wages are administered, how large are the zones of price control, and to what extent members of a group like big business would cooperate rather than compete. Yet these are all crucial elements of the theory. For example, an oligopolist might not be able to raise its price since that would create sufficient profit opportunities to attract new competitors. And not being able to raise price makes the theory inapplicable. Therefore, unless these questions can be satisfactorily answered, it is possible to accept the abstract theory without seeing any relevance to the American economy.

Present rhetoric acknowledges the latter part of this conclusion. For example, President Carter's chief inflation fighter Alfred Kahn has stated "it has been recognized that wage and price controls would be futile if they were not accompanied by really quite stringent budgetary restraint and monetary restraint." It should be noted, however, that political rhetoric has often endorsed demand restraint while simultaneous actions produced monetary-fiscal expansion.

CONCLUSION

Economic activity consists of the production and exchange of goods and services. A person may exchange productive labor for money wages, and at a different time trade the money for any of numerous commodities. Trades are made whenever each party concerned believes the transaction will improve his own well-being. Wage-price controls, however, seek to prohibit certain of these mutually beneficial transactions. In so doing, controls conflict with a very powerful human motivation, the desire to improve one's own well-being. Therefore it is not clear that controls will actually succeed in prohibiting transactions.

Even if the central authority does successfully limit the transactions people can make, it does not follow that the effects will be desirable. Since governments are limited in the amount of information they can acquire and process, and make decisions slowly, if at all, single market distortions are inevitable when controls are effective. Dogged controllers, undeterred by such distortions, could cause general excess demand unless they were to follow the unusual procedure of concurrently restricting aggregate demand by monetary or fiscal policy.

And even if aggregate demand restraint is concurrently employed, and if single market effects are not severe, wage-price controls still may not have a desirable impact on the economy. The theoretical argument that controls will allow the economy to avoid general excess supply requires not only that the government be better able to identify appropriate price and wage levels than the market process, but also to be able to act expeditiously upon that knowledge. Both requirements are stringent, and demand a higher level of governmental competence than is actually observed.

Therefore, employing wage-price restraint to battle inflation might well prove to be the Viet Nam of economic policy. That is, the battle is likely to be protracted, with no light at the end of the tunnel, and with burdens on the population mounting as the battle

continues. Perhaps a paraphrase of Senator Aiken's Viet Nam strategy is appropriate for wage and price controls. That is, declare victory over inflation if necessary, but end the controls program immediately.

APPENDIX

This appendix uses a simplified model economy to examine macroeconomic disequilibrium. After the basic features of the economy are presented, suppressed inflation is studied in Part I. A more traditional recession is analyzed in Part II, as a first step towards explaining a rationale sometimes given for wage-price restraint. The disequilibrium model presented is quite flexible, and can be applied to a wide range of macroeconomic problems.

I. GENERAL EXCESS DEMAND

The Basic Model Imagine an economy with three markets: output (Y), labor (L), and money (M); three types of decision makers: firms, households, and a government; and two prices: the price of commodity output (P) and the price of labor (W). Households and firms engage in economic activity in their own self-interest, and no attempt is made to explain why the government engages in economic activity.

Households make two economic decisions: how much output to buy and how much labor to sell. It is assumed that the higher the real wage (W/P) or the higher their real money balances (M/P), the more output households wish to consume (C^d). While a higher real wage is assumed to induce households to supply more labor (L^s), it is assumed that households who are wealthier because of higher real money balances enjoy their additional wealth by consuming both additional output and additional leisure. Since more leisure means less work, increasing real money balances will lower the labor supply schedule (that is, the amounts of labor potentially offered at each possible wage rate).

Firms decide how much output they produce (Y^s); their labor demand (L^d) is the quantity of labor needed to produce Y^s .¹⁰ An increase in the real wage rate lowers the demand for labor and thus, with less labor employed, a smaller amount of output is produced. Government obtains funds to purchase output (G) by taxing households or printing money. Ag-

gregate commodity demand (Y^d) is the sum of demands by households and the government.

For the commodity market to be in equilibrium, it is necessary that $Y^s = C^d + G$; for labor market equilibrium, $L^s = L^d$. If these two markets are in equilibrium, so must the money market¹¹ and the model economy consequently exhibits general equilibrium. If $L^d > L^s$ and $C^d + G > Y^s$, the situation will be labeled general excess demand (although general here refers to only the "real" sectors as opposed to the monetary sector).

Persistent Excess Demand Assume that there is initially a general equilibrium, with L_0 hours of labor and Y_0 units of output exchanged at wage W_0 and price P_0 . Now imagine that the government prints additional money (M rises from M_0 to M_1) and distributes it to households. A first analysis might simply note (as described above) that the increase in real money holdings would increase household demand for output but decrease household labor supply (by increasing the demand for leisure). If the wage and price levels did not change, there would be excess demand in each market, as shown in Figure 2. However, a sufficient increase in the price level could lower M_1/P to M_0/P_0 ; along with the same percentage increase in the wage level, commodity demand and labor supply of households would return to their original values.

Now suppose that wage-price restraint is imposed at the same time the money supply is increased. If wages and prices do not adjust then there are new questions to answer. First, what quantities are exchanged in each market? When quantity demanded is equal to quantity supplied, the answer is easy. But now quantity demanded is greater than quantity supplied. The answer uses the assumption that households and firms engage in economic activity in their own self-interest, and are not forced to make any transactions; accordingly, the quantity supplied is the quantity exchanged. Suppliers do not wish to supply more and are not forced to.

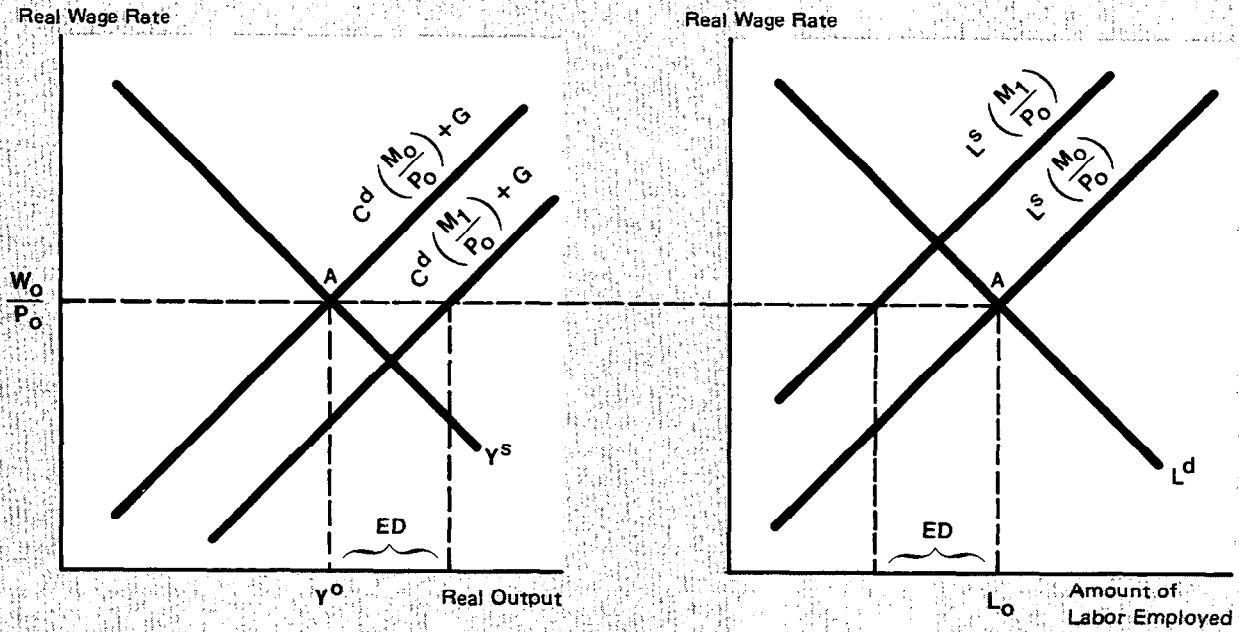
While a naive analysis might stop here, there is another problem. Firms cannot buy as much labor by paying W_0 as they could before; is it reasonable to assume an unchanged supply of output? In this simple world, cutting back labor input directly lowers the level of commodity output. As shown in Figure 3, $Y^{s'}$ is the effective commodity supply given the labor market constraint on the amount of labor firms

¹⁰ More precisely, there is an aggregate production function F such that $Y = F(L)$; moreover, it is also assumed that the quantity produced is equal to the quantity sold.

¹¹ This follows from direct application of Walras' Law. Crouch presents an unusually clear exposition of Walras' Law.

Figure 2

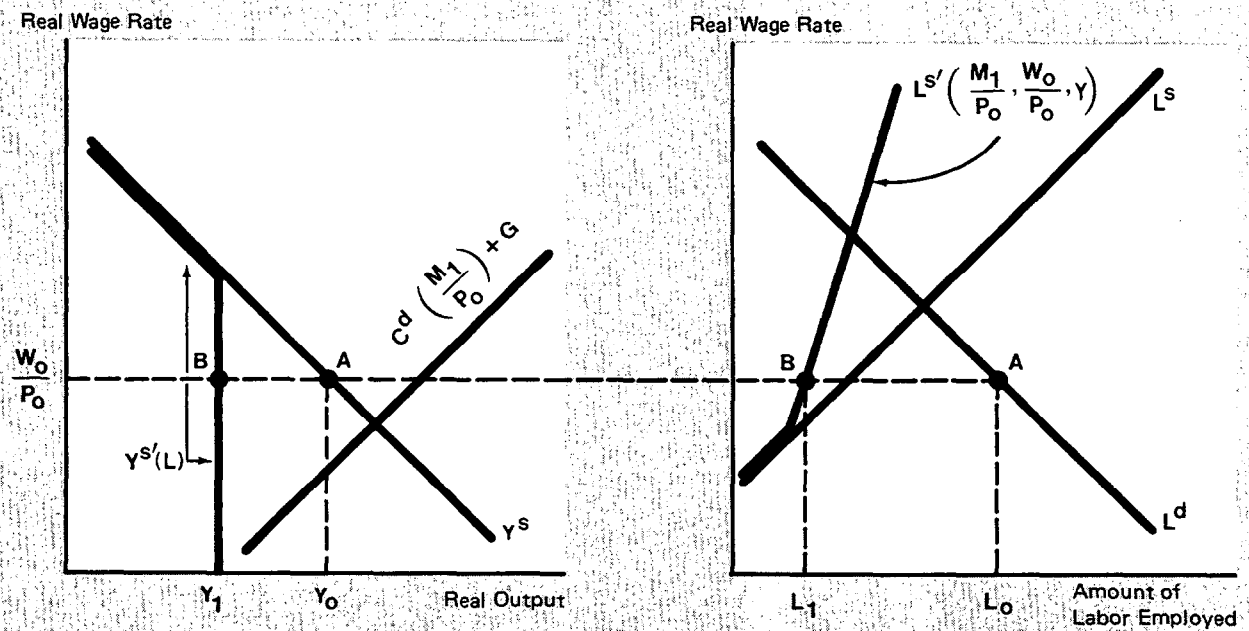
A FIRST LOOK AT EXCESS DEMAND



As a result of an increase in the money supply from M_0 to M_1 , there is excess demand ED in each market if wage and price levels are unchanged. Spillovers between markets are ignored.

Figure 3

EXCESS DEMAND AND INTER-MARKET CONSTRAINTS



If wage and price levels do not change when there is excess demand, the effective supply of output will be $Y^{S'}$ and the effective labor supply will be $L^{S'}$. New levels of output and employment will be Y_1 and L_1 .

can purchase. Moreover, there is another spillover: households supply labor in order to receive wages with which they buy output; if they cannot buy all the output they wish, then they can at least reduce their labor supply and have more leisure time to enjoy. Thus the labor supply can be represented as in Figure 3 by L^s , the effective supply of labor given the commodity market constraint on the amount of output households can purchase.

The analysis presented above can be summarized with the aid of a graph, such as the one in Figure 4, which includes effective supply curves for labor and real output, L^s and Y^s . Demand curves are omitted since when there is excess demand, exchange is limited to the amount supplied. At point A both markets are in equilibrium. While the wage and price levels are restrained at W_0 and P_0 , the quantity of money is increased from M_0 to M_1 . As a result there are excess demands in the labor and output markets. Households thus face a supply constraint on consumption and firms face a supply constraint on labor purchases. In response, households reduce effective labor supply and firms reduce effective out-

put supply. The final outcome yields levels of employment and output, point B, significantly below initial levels.

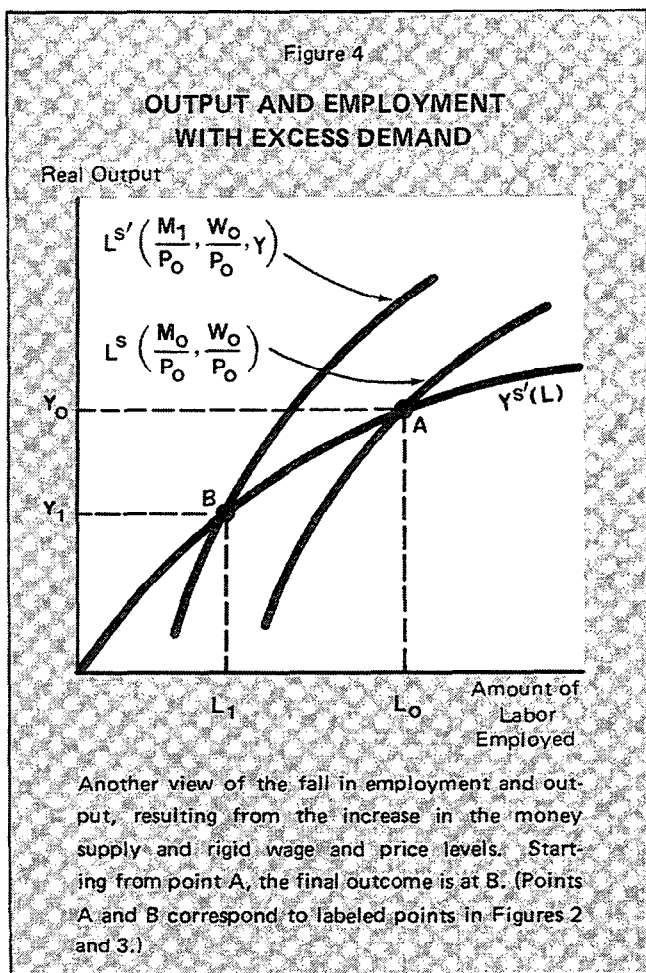
Recovery The economy can recover and move back to point A in one of two ways. If restraints are removed and the price level rises enough so that M/P returns to its old level, and there is an equal percentage increase in the wage level, then the economy can move from B to A. If wages and prices continue to be restrained, a cut in the money supply¹² can still result in movement from B to A. In either case, after adjustment $W/P = W_0/P_0$ and $M/P = M_0/P_0$; therefore $Y^d = Y^s = Y_0$ and $L^d = L^s = L_0$.

This analysis can give meaning to the phrases "too high" or "too low" a price and/or wage level. At point B both the price level and the wage level are too low, since increasing both would increase employment and output. One of the hardest tasks in learning economics is unlearning oft-repeated fallacies; one such fallacy is that high prices are bad but low prices are good. As has been seen, if low prices and wages result in general excess demand, then the whole economy suffers.

It is interesting to contrast this general approach with the partial analysis of viewing equilibrium in only one market, as in Figure 2. Imagine, as before, that the money supply increases and, consequently, households' planned purchases rise. In the market for output it would appear that lowering the real wage, by lowering W with P unchanged, would effect a new equilibrium at an output level higher than Y_0 . A general analysis, as summarized in Figure 3, would show the error of ignoring the labor market. The initial shock causes a movement from A to B. If W were forced down with P unchanged, then L^s would shift to the left, resulting in even lower output and employment than at B.

II. GENERAL EXCESS SUPPLY

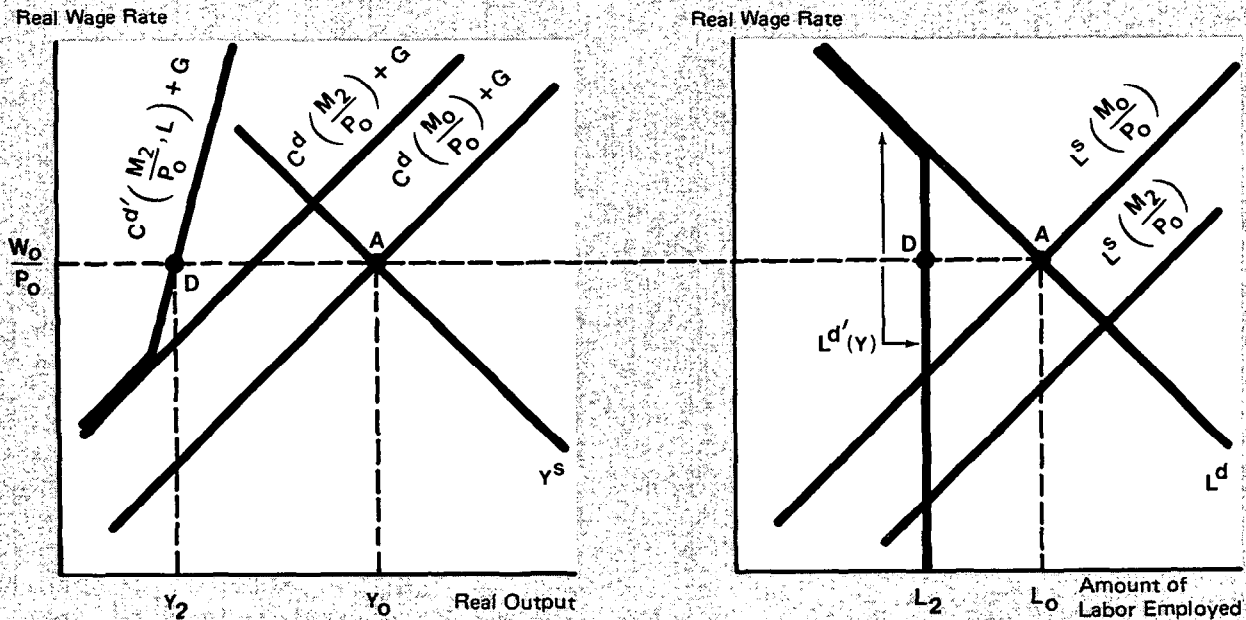
Without Continuing Inflation The basic model of Part I will be used to examine a typical recession, in which the problem is general excess supply rather than general excess demand. Assume that initially there is a general equilibrium, with L_0 hours of labor and Y_0 units of output exchanged at wage W_0 and price P_0 . Now suppose that the money supply is suddenly reduced from M_0 to M_2 . A first analysis might simply note that the decrease in real money holdings would decrease household demand for output and leisure. Thus if wages and prices did not



¹² More generally, any action which decreases aggregate demand can be substituted for a cut in the money supply.

Figure 5

EXCESS SUPPLY AND INTER-MARKET CONSTRAINTS



A fall in the money supply from M_0 to M_2 , with unchanging wage and price levels W_0 and P_0 , results in lower consumption demand and higher labor supply. Inter-market constraints lower effective demand for consumption to $C^{d'}$ and effective demand for labor to $L^{d'}$.

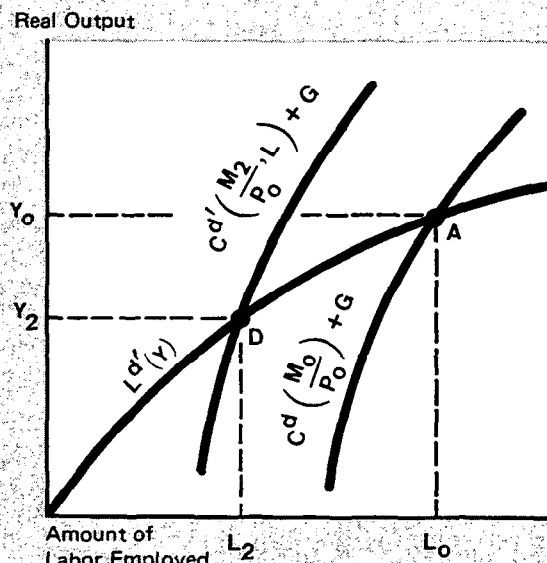
change there would be excess supply in both the commodity and labor markets. However, a sufficient decrease in the price level could raise M_2/P to M_0/P_0 ; along with the same percentage decrease in the wage level, C^d and L^s would return to their original values.

Now suppose that wages and prices cannot fall as much as described above. Consequently there is still excess supply in each market. As before, when quantities supplied and demanded are not equal, the lesser of the two is the quantity traded. Thus, the quantity demanded is the quantity exchanged. Also, there are spillovers between the two markets. Firms cannot sell as many commodities as in equilibrium; therefore they have a smaller labor requirement. Households cannot sell all the labor they wish; this fall in income lowers their planned commodity purchases. Thus the initial shock is exacerbated by these reinforcing spillovers. In other words, the initial aggregate demand shock has a multiplier effect.

The resulting situation is illustrated in Figure 5 with effective demand curves for labor and commodities. Note that disequilibrium does not result from too high or too low a real wage; on the labor market side, the real wage rate can vary substantially without affecting the quantity of labor employed. Effective

Figure 6

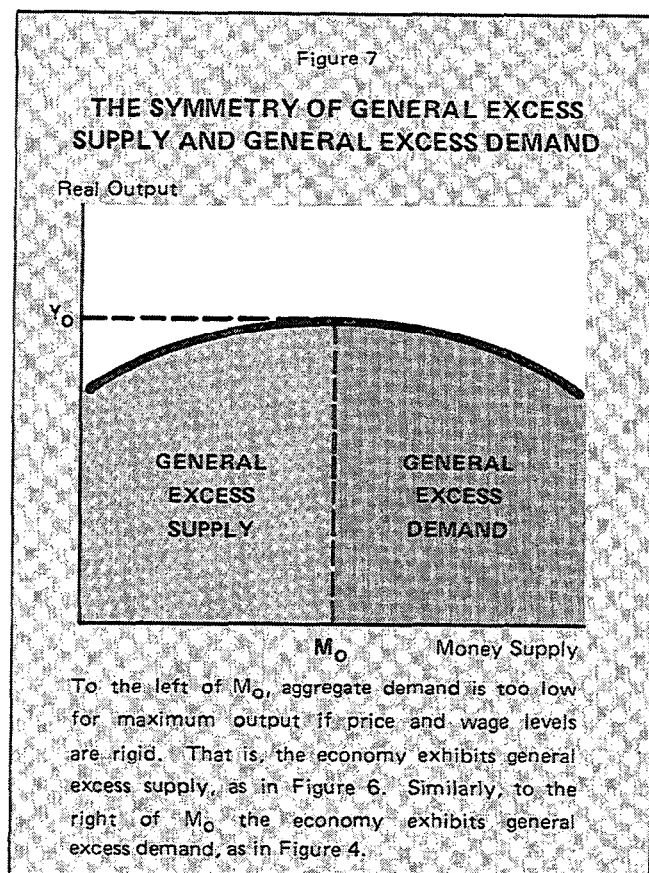
OUTPUT AND EMPLOYMENT WITH EXCESS SUPPLY



Another view of the employment and output fall under general excess supply. As in Figure 5, the initial position is represented by point A, and final position by D.

demand curves are also drawn in Figure 6. Supply curves are omitted, since under excess supply, exchange is limited to quantity demanded. The initial demand shock is a reduction in the quantity of money from M_0 to M_2 , with the wage and price levels stuck at W_0 and P_0 . Consequently there is general excess supply. The final outcome entails levels of output and employment, point D, significantly below initial levels. Recovery occurs in an analogous manner to the case of general excess demand. Either the wage and price levels must fall, or the money supply must rise, so that $W/P = W_0/P_0$ and $M/P = M_0/P_0$.

The symmetry of general excess supply and general excess demand is illustrated in Figure 7. It is assumed that the real wage is W_0/P_0 and that wage and price levels are frozen. Then there is one quantity of money at which output is at its maximum level, Y_0 . A lower money supply results in general excess supply while a higher money supply results in general excess demand. One can also observe the potential importance of a flexible price level, which could change M/P and thus raise output from low disequilibrium levels. Similar diagrams can be used to illustrate effects of other variables, such as government spending or taxes.



Recession with Inflation The preceding section presents a disequilibrium model of a recession in an economy without continuing inflation. In this section an ad hoc addition is made to the basic model so that continuing inflation is included. The purpose is to show how monetary-fiscal restraint can trigger general excess supply, and how this might be avoided by perfectly administered wage-price restraint.

Suppose that in every month for the past 10 years, the money supply has increased by 1 percent, although the monetary authority announced at various times its intention of slowing money growth. In the simple economy described above, general equilibrium could be maintained by price and wage levels rising 1 percent per month. Furthermore, imagine the monetary authority again announcing its intention of slowing money growth and actually stopping growth completely. Using anticipations (which with perfect hindsight can be seen to be incorrect) based on the previous 10 years, firms and households might well ignore the monetary authority's announcement and agree to wages and prices 1 percent higher. If the higher wage and price levels stuck, there would be general excess supply, as described above. Real money holdings would fall as the price level rose and the money supply did not change; consequently, households would cut purchase plans. As a result, firms would demand less labor. But if households could not sell their desired amount of labor at the going wage, they would lower planned purchases.

Thus monetary restraint would cause an initial fall in output and employment. If monetary restraint were maintained, then for recovery to occur it would be necessary for households and firms to correctly comprehend the monetary action, and for prices and wages to adjust accordingly. However, an effective freeze of prices and wages at the same time the money supply was first held constant would avoid the general excess supply scenario. Quantities exchanged in the commodity and labor markets would not fall when the money supply is lower than expected. This happy result is due to artificially low price and wage levels being consistent with the unexpectedly low money supply and general equilibrium.

Even in this simple world, there are quite strong necessary conditions for wage-price restraint to achieve the potential output-employment gains mentioned above. First, prices and wages must not automatically fall when monetary restraint is imposed (otherwise, monetary restraint would not cause general excess supply). Next, the wage-price controllers must have better knowledge of the extent of monetary restraint than the public (otherwise, the public

could adjust prices and wages to appropriate levels without intervention). Finally, wage-price restraint must be effective.

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